3.3 Slopes of Lines

Slope = $\frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x}$

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(x, y)

Find the slope.

1. A(1, 3) B(-2, -3)

$m = \frac{3 - -3}{1 - -2} = \frac{6}{3}$

$m = 2$

2. C(8, -2) D(5, 3)

$m = \frac{-2 - 3}{8 - 5} = -\frac{5}{3}$

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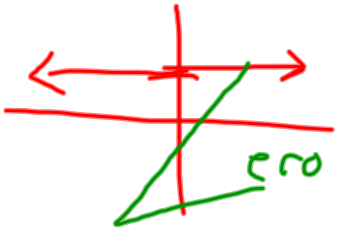
3. E(8, 1) F (4, 1)

$m = \frac{1-1}{8-4} = \frac{0}{4}$

$m = 0$

* horizontal line

eqn. $y = 1$



4. G(-2, 1) H(-2, -5)

$m = \frac{1--5}{-2--2} = \frac{6}{0}$

undefined
no slope

* vertical line

eqn. $x = -2$

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Parallel lines have the same slope

Perpendicular lines have slopes that are opposite reciprocals

ex:

$m = \frac{2}{3} \perp m = -\frac{3}{2}$

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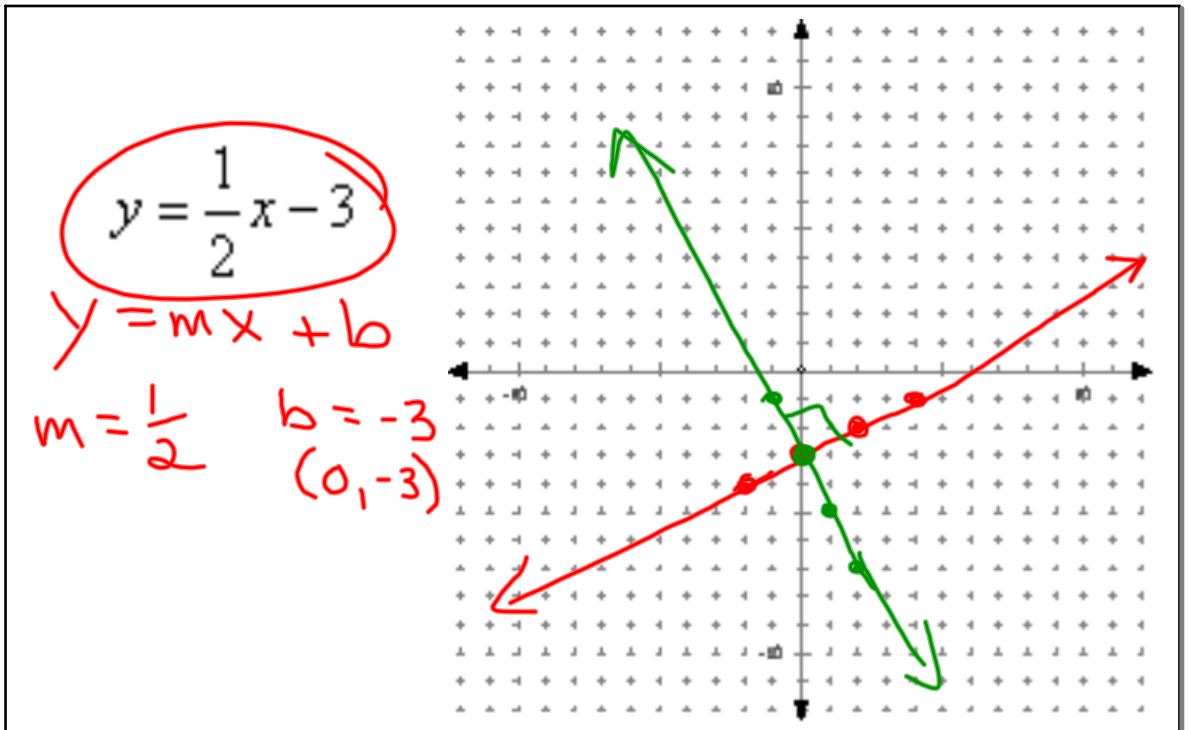

Give an equation of a line ⊥ to the line above

$y = -2x - 3$

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3-4 Equations of lines

Slope-intercept form $y = mx + b$

Point-slope form $y - y_1 = m(x - x_1)$

Standard form $Ax + By = C$ **A, B, & C are integers, A is positive, A, B, & C have a GCF of 1**

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Write the equation of the line given the following information.

1. (0, 8) m = 3

Plug in → $y = mx + b$

$y = 3x + b$

$8 = 3(0) + b$

$8 = b$

$y = 3x + 8$

Std. Form $3x - y = -8$

2. (-3, -6) m = 2

$y = mx + b$

$y = 2x + b$

$-6 = 2(-3) + b$

$-6 = -6 + b$

$0 = b$

$\therefore y = 2x$

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3. (6, -3) (8, -9)

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4. Write the equation of the line ⊥ to 2x + y = 5 and passes through (1, -7).

$y = -2x + 5$

$m = -2$

$\perp$ slope: $m = \frac{1}{2}$

$(1, -7)$

pt. slope $y - y_1 = m(x - x_1)$

$y + 7 = \frac{1}{2}(x - 1)$

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5. Write the equation of the line || to 3y - x = 4 and passes through (3, 10).

$3y - x = 4$

$3y = x + 4$

$y = \frac{1}{3}x + \frac{4}{3}$

$m = \frac{1}{3}$

$m = \frac{1}{3}$

$(3, 10)$

$y = mx + b$

$y = \frac{1}{3}x + b$

$10 = \frac{1}{3}(3) + b$

$9 = b$

$y = \frac{1}{3}x + 9$

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6. Write the equation of the line ⊥ to the line containing (4, 3) (4, 8) and passing through (2, -9).

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HW p142-143 15-23 odd, 28, 31, 33, 36
P148-149 19, 22, 39, 41, 43, 44

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